National Institute of Environmental Health Sciences

Wild canids as sentinels of ecological health: A conservation medicine perspective

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Abstract:

The extinction of species across the globe is accelerating, directly or indirectly due to human activities. Biological impoverishment, habitat fragmentation, climate change, increasing toxification, and the rapid global movement of people and other living organisms have worked synergistically to diminish ecosystem function. This has resulted in unprecedented levels of disease emergence, driven by human-induced environmental degradation, which poses a threat to the survival and health of biodiversity. The emerging discipline of conservation medicine addresses these concerns through the following entities: humans; global climate; habitat destruction and alteration; biodiversity, including wildlife populations; domestic animals; and pathogens, parasites and pollutants. Furthermore, conservation medicine focuses on explicit linkages between these entities. As a crisis discipline, the usefulness of conservation medicine ultimately will depend on its applicability to solving problems. The perspectives and scientific findings of conservation medicine provide input into biomedical education; and policy and management of ecosystems, habitats and imperiled species. A sentinel species is one that has presented itself, or has been selected, to provide insight into the state (health) of an ecosystem, based on user-defined (e.g., researchers, conservationists or policymakers) objectives (e.g., disease, parasites, toxics, climate change, habitat destruction), coupled with the utility and vulnerability of this species to the perceived stress. Wild canids may serve as excellent sentinel species of emerging canine vector-borne diseases. The scientific information generated by the sentinel species should empower stakeholders and decision-makers to take mitigative action or support predictive capabilities; the "utility" of the species selected should consider its value and relevance to conservationists and to society at large (e.g., education and outreach; social sciences). Several canine vector-borne diseases or antibodies to these pathogens have been identified in wild canids including visceral leishmaniosis, Lyme disease, heartworm, hepatozoonosis and anaplasmosis to name a few. These reports are relatively recent as they relate to wildlife-domestic animal interactions, globalisation, translocations, habitat fragmentation and climate change. These pathogens and their relationship to wild canids are described herein. Further research needs to be performed to elucidate the role of the 36 extant species of wild canids in the epidemiology of canine vector-borne diseases.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Human Conflict/Displacement, Temperature

Temperature: Fluctuations

Geographic Feature: ☑

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Global or Unspecified

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Fly-borne Disease, General Vectorborne, Tick-borne Disease

Fly-borne Disease: Leishmaniasis

Tick-borne Disease: Anaplasmosis, Lyme Disease

Resource Type: ☑

format or standard characteristic of resource

Review

Timescale: ☑

time period studied

Time Scale Unspecified